REMARKS

Claims 1, 2 and 5-9 and 12-16 are pending in this application. Claim 3-4 and 10-11 have been canceled.

Claim 8 has been objected to under 37 C.F.R. 1.75(c) as being an improper dependent claim. Claim 8 has been amended to further restrict claim 1 and thereby overcome the objection under 37 C.F.R. 1.75(c). Support for amended claim 8 is found in Example 4 on page 18 of Applicants' specification.

Claims 1-14 are rejected under 35 U.S.C. § 112, second paragraph, as being indefinite. Claim 1 has been amended to render it more definite and consistent with the specification as required by the Examiner. Claim 2 has been amended as suggested by the Examiner. As is apparent from Applicants' specification, Claims 5-7, 9 and 12-14 refer to all resulting layers of materials and films that are formed including the pretreating layer. Accordingly, it believed that the rejection of such claims under 35 U.S.C. § 112, second paragraph, should be withdrawn.

Claims 1-14 are rejected over U.S. Patent No. 5,208,111 to Decher et al ("Decher et al") in view of U.S. Patent No. 6,589,665 to Chabrecek et al ("Chabrecek et al"), alone, or in further view of U.S. Patent No. 5,393,624 to Ushijima ("Ushijima").

Decher et al is relied on (page 4, para. 6 of the Office Action) as showing the claimed method of introducing a charge to a substrate, applying a coating material (A) bindable with the substrate, rinsing the substrate; applying a second bindable material (B), rinsing the substrate and repeating such steps.

However, as recognized by the Examiner, Decher et al lack a teaching of applying materials (A) and (B) and rinsing solvents by spin coating (page 4, lines 11-13 of the Office Action), which is at the heart of Applicants' claimed invention. The Examiner seeks to remedy the deficiencies of Decher et al by relying on Chabrecek et al, as disclosing that the

formation of bilayers on a substrate may be accomplished according to known processes and concludes that the layers of polymer may be successively coated by spin coating (col. 6, lines 50-63).

Applicants have discovered a process for forming multilayers on a substrate by alternatively dropping a material bindable with the material deposited on the substrate and spinning the substrate under high rotational speeds with rinses of solvent in between achieved by also dropping the solvent onto the newly coated substrate and fastly spinning the coated substrate. Using this technique, the multilayers are formed not only by the attractive intermolecular force between adjacent layers, but also by the viscous force due to the facile solvent removal during spinning, as explained on page 12, first full paragraph of Applicants' specification. In addition, centrifugal force and air shear force additionally act as driving forces for producing the multilayers of the present invention because the multilayers are built up against the direction of gravitational force.

As demonstrated in Applicants' Examples 2a, 2b, Comparative Examples 1a and 1b on pages 15-16 of Applicants' specification and shown in Figs. 4a and 4b, the absorbed amounts of films formed by the spin method are much greater than with the dipping method because adsorption and rearrangement of adsorbed polyelectrolyte chains on the surface and elimination of weakly bound polymer chains from the substrate by the spin process are simultaneously achieved by a high spinning speed in a short time. Also, the fast elimination rate of water by the spinning increases the mole concentration of the polyelectrolyte solution during the short deposition time and yields thicker layers despite the thin film formation typically provided by centrifugal and air shear force, as explained in the paragraph bridging pages 16-17 of the present application. Claim 1 has been amended to recite that the bindable material and washing solvent, respectively, are dropped onto the substrate and spun to clearly distinguish the dipping method of multilayer formation. Support for claim 1 is found on page

11, line 9 to page 12, line 11, and the Examples of the present specification. New claims 15 and 16 find support in Example 1a on pages 13-14 of the present specification.

As pointed out on page 2, lines 22 et seq. of Applicants' specification, the Decher et al process and similar processes without thorough washing after adsorption of the polyelectrolyte layer lead to several problems, including increased surface roughness, yielding poor film quality (page 4, last full paragraph of Applicants' specification).

Chabrecek et al cannot remedy the deficiencies of Decher et al, since Chabrecek et al teach away from Applicants' claimed process in which multiple rinsing and spinning the solvent away is utilized. As in the case of Decher et al, Chabrecek et al disclose an immersion process in which a "more preferred" dip method is used without a rinsing or drying step between (col. 7, lines 7-14). Likewise, while Chabrecek et al mention "spin coating" as one of many alternatives to immersion in column 6, lines 52 et seq., Chabrecek et al state thereafter (col. 6, lines 61-63):

> "However, it is preferred to omit a rinsing or drying step between the attachment of the first and second ionic polymer."

Thus, Chabrecek et al specifically teach away from Applicants' claimed process of alternatively dropping bindable material and washing solvent onto a substrate that is spun at high speeds for short periods, as claimed. Moreover, Chabrecek et al are basically concerned with an immersion process. The Chabrecek et al "shot gun" disclosure of spin coating along with spraying, printing, spreading, pouring, and many other alternatives fails to even discuss how one would employ a "spin coating" process for forming bilayers or how one would rinse between spin coating applications. Chabrecek et al do not disclose dropping washing solvent onto the coated substrate and spinning the substrate under high rotational speeds to remove weakly bound coating material to increase the mole concentration of coating material on the substrate. Likewise, Chabrecek et al are silent as to the spinning speeds and times for coating bindable material much less for removal of weakly bound coating material with washing

solvent. Thus, Chabrecek et al never disclose how one would use a washing solvent between coating applications, which is not surprising since Chabrecek et al teach against rinsing.

On page 5, lines 8-11 of the Office Action, the Examiner states

> "that it is well known in the spin coating art to rinse coated substrates using a spin coating technique if the coating has been applied by spin coating for efficiency and economic reasons (i.e., the substrate is already present on the spin coating apparatus)."

The Examiner is hereby requested to provide her affidavit in support of this statement or cite prior art to this effect. Similarly, on page 5, first full paragraph, the Examiner states that the spin speeds and times are a "cause-effective" variable which affects the thickness and uniformity and is within the skill of the art to determine. Such statement should also be the subject of the Examiner's affidavit or prior art should be cited in this regard.

Since neither Decher et al nor Chabrecek et al teach or suggest Applicants' claimed process as recited in claim 1 including dropping bindable material and washing solvent, respectively, on a substrate and spinning such substrate under recited conditions, such combination is defective. Thus, where a reference does not disclose a feature of a claim relied on to distinguish the prior art, it cannot suggest modifying the prior art to contain that feature, see *In re Civitello*, 144 USPQ 10 (1964) wherein the CCPA stated:

> Since Haslacher fails to <u>disclose</u> the feature of the claim relied on, we do not agree with the Patent Office that it would <u>suggest</u> modifying the Craig bag to contain that feature. The Patent Office finds the suggestion, only after making a modification which is not suggested, as we see it, by anything other than appellant's own disclosure. This is hindsight reconstruction. It does not establish obviousness. (Emphasis the Court's).

See also *In re Glass*, 176 USPQ 489 (1973) wherein the CCPA stated that it is error to ignore specific limitations distinguishing over the references. Thus, since neither Decher et al nor Chabrecek et al disclose the claimed method, the rejection based on the combination of such patents should be withdrawn, since it is based on a hindsight reconstruction and does not

establish obviousness. Accordingly, the rejection of claims 1-14 over Decher et al in view of Chabrecek et al should be withdrawn.

Alternatively, the Examiner relies on U.S. Patent No. 5,393,624 to Ushijima ("Ushijima") in combination with both Decher et al and Chabrecek et al. Ushijima is concerned with forming a resist film of desired thickness on a semiconductor wafer using a developer and rinse solution, and is relied on as showing that it well known in the spin coating art to rinse substrates using spin coating techniques (col. 8, lines 23-25), as well as that spin speeds and times directly affect the thickness of coatings (col. 3, lines 60-66 and col. 11, lines 14-19).

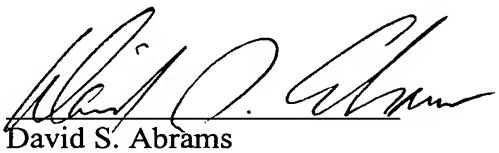
Ushijima is concerned with a method for manufacturing a semiconductor by performing photolithography on a semiconductor wafer to form chips having electrodes in a predetermined pattern, and includes forming a target resist film thickness and including a number of steps (see column 2, lines 24-61), which have no pertinency to Applicants' claimed process. The process of Ushijima cited by the Examiner at column 8, lines 23-25 involves treating a wafer W that has numerous chips on the pattern formation surface thereof and has been treated in various operations is loaded in a developing section to contact developer and develop the resist film. The wafer W is thereafter treated with a rinse solution. Thus, Ushijima is concerned with an entirely different system and does not disclose Applicants' claimed process in which ultrathin multilayer films are formed by dropping a bindable material onto a spinning substrate under specified conditions of rotation and time and thereafter dropping washing solvent onto the substrate to remove weakly bound bindable material as claimed in an alternative sequence.

Ushijima is not properly combinable with Decher et al and Chabrecek et al, who are concerned with an entirely different process. However, even if such patents were combinable, such combination would not render Applicants' claimed process obvious, since

Ushijima does not supply the deficiencies of the primary patent, which does not disclose spin coating and rinsing, and the secondary patent, which teaches away from rinsing and does not disclose spin rinsing. Thus, Ushijima does not disclose repeatedly dropping coating material and washing solvent, respectively, onto a spinning substrate and does not disclose any rotational speeds to times for doing so and accomplishing the formation of a thin film or to remove weakly bound film forming material. It is apparent that the only motivation for combining Ushijima with Decher et al and Chabrecek et al is hindsight reliance on Applicants' own specification. Accordingly, the rejection of claims 1-14 over Decher et al in view of Chabrecek et al and Ushijima should be withdrawn.

For the foregoing reasons it is submitted that the claims are in condition for allowance. Such action is earnestly solicited.

Respectfully submitted,



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Dated: June 2, 2004